



SFF Project 404831 Milestone M03 First Project Report

Increasing the Market Share for New Zealand Olive Oil

Contents

Introduction	1
Section One Focus Grove Field Day Reports – Prepared by Stuart Tustin, Plant and Food Research	
Production Figures	2
Nelson Focus Grove Field Visit.....	2
Canterbury Focus Grove Field Visit	3
Hawke’s Bay Focus Grove Field Visit.....	3
Wairarapa Focus Grove Field Visit.....	4
Section Two Focus Grove Field Day Minutes – Prepared by Regional Chairs	
Nelson Focus Grove Field Day.....	5
Canterbury Focus Grove Field Day.....	7
Hawke’s Bay Focus Grove Field Day	9
Wairarapa Focus Grove Field Day	11
Northland Field Day	13

Introduction

The purpose of the Sustainable Farming Fund project is:

To increase the market share for New Zealand produced olive oil by identifying basic grove management practices to enable the industry to consistently lift productivity of fruit per hectare and thus also reduce costs. This will allow the New Zealand industry to compete effectively with imported olive oils to increase market share.

The objectives to achieve the purpose are aimed at practice changes that enhance tree and grove productivity.

The methods use expert tree crops horticultural advice focusing in two key aspects of grove management.

1. Improving tree health by disease control using affordable protectant spray programmes to eliminate foliage diseases that defoliate olive trees, a primary cause of low productivity in NZ groves.
2. Introducing practical, affordable tree pruning regimes that improve light distribution for stimulating flowering and fruit growth, aiding effective spray coverage and inducing adequate annual shoot growth to provide the required bud sites for new flower production – on an annual basis.

This milestone report outlines the progress and information assembled from the first round of grove visits and field days with members conducted within the SFF project plan. The visits were carried out by the two consultants engaged as part of the projects; one from Plant and Food Research and one from Forty Groves Ltd.

Section One Focus Grove Field Day Reports – Prepared by Stuart Tustin, Plant and Food Research

Production Figures

The starting Point : Regional Average Production/tree

kg per tree including Focus Groves yields for Frantoio

Region	2014	2015	2016
Hawke's Bay	27	1.88	28
Wairarapa	5.07	Frosted	5.76
Nelson	2.42	8.07	7.11
Canterbury	0.79	0.73	3.42

- High annual alternation (biennial bearing)
 - Huge variance in yields among regions
 - Some signs of improving trends (Nelson, Canterbury)....
- ...is it just better data collection or improvements in grove management??



Preliminary Findings and Anecdotes – Focus Groves

Participant	Harvest data: Frantoio (kg)			
	Region	2014	2015	2016
Aquiferra	Hawke's Bay	22.8	21.7	21.1
Leafyridge	Wairarapa	15.2	Frosted	19.1
Kakariki	Nelson	1.1	16	12
Terrace Edge	Canterbury	1.9	1.9	16.1

What is the management at Aquiferra that is enabling consistent and higher yields per tree?

What management practices can increase tree yield at Aquiferra even further?



Nelson Focus Grove Field Visit

The grove leaf condition was found to have improved markedly from 12 months earlier, as a response to the careful attention by the grower in conducting weather-responsive fungicide applications for leaf disease control. Leaf retention, the key indicator of disease control, was excellent and there was ample evidence of abundant flower initials for the 2017 crop. This was especially informative because the abundance of return flowering in October 2016 (the source of the 2017 crop) was not suppressed by the previous heavy yield from the 2016 crop. These features suggest that the long term control of leaf diseases and reduced disease incidence are central to both improving tree yields and the

capacity to provide strong return flowering annually, for the succeeding crop. The project will monitor these trends closely to learn more.

The grove has made good progress with major tree restructuring according to the advice introduced 12 months earlier aimed at reduction in tree height and opening up dense tree structure to an open-centre canopy format for improving light distribution and spray penetration collectively. The process of restructuring trees is also aimed at enabling the annual stimulation of abundant new shoot growth that is necessary for providing the next years floral bud sites. Since olive is a drupe (stonefruit) the flowering and fruiting behavior is reliant on new annual vegetative shoot growth to provide the sites for the next year's flowers. Hence a canopy management strategy needs to achieve adequate annual growth for this purpose, whilst retaining sufficient total tree structure and volume for optimum annual crop production.

Canterbury Focus Grove Field Visit

A very similar situation was found at Terrace Edge Grove as was described above at Kakariki Olives, Nelson. Particular attention had been made to disease management in the past 12 months from the initial visit. Irrigation capacity had been increased based on evidence from a leaking irrigation pipe the previous season that demonstrated that the grove could benefit from greater water supply to increase tree size. The grove now has double drip lines doubling the capacity to deliver water to the tree rows.

Less tree restructuring had been completed than in Nelson although good progress was being made. Tree restructuring at this site did not require tree height reduction. However in response to Canterbury wind effects trees were very dense so more attention was paid to pruning to achieve light and spray penetration and stimulating regular annual vegetative growth. This was done with attention to the likely effects of Nor-wester winds on tree shape. Strong evidence of likely abundant flowering could be found which added to the interpretations made at the Nelson site suggesting the key role of healthy leaf canopy to achieving adequate growth and annual return flowering.

This grove is making significant improvement in tree productivity from a low base and has shown excellent responses in just a single year by accomplishing the first steps to implement the aims of the SFF project, in practical ways.

Hawke's Bay Focus Grove Field Visit

The Hawke's Bay Focus Grove has likely had the longest period under intensive disease control management than any grove in NZ. We consider it to be the NZ exemplar grove for the project. To support this position we note that the average tree yield of olives in 2016 crop was 26 kg. In view of the yield potential evident we hope to achieve regular annual cropping at 30 kg per tree within this project.

Tree stature is well controlled yet also at the upper limit of what the project tree 'ideotype' would be – in the range of 5-6 m height. Canopy leaf health is very

good and clearly giving the benefits with large annual crops being achieved. Where tree height is at the upper limit there is some disease evident high up, which is acknowledged as arising from lack of reach by the air blast sprayer. The effects of refining the tree structure to gain a little more porosity and a small reduction in tree height will improve this situation.

The grove was mostly pruned before the field visit and field day. Applying the concepts outlined by the SFF project the grove owners proceeded to undertake quite significant tree restructuring. This was also done in early spring ahead of the appearance of visible floral primordia. In our opinion slightly excessive pruning has been done – possibly actually doing the 2016 and the 2017 pruning needs in one event. The prediction is that the yield potential has been reduced by 5-10 kg per tree. It will be interesting to see how the grove responds and whether fruit set and fruit size can compensate for the more intensive pruning. This will be very instructive to the project. One row of each of 3 cultivars was left unpruned and will be pruned now according to the project specifications, which is less severe in 2016 than has been applied across the rest of the grove. This will give us a very good comparison of two different intensities of annual pruning and the yield responses that arise over the next two years.

Wairarapa Focus Grove Field Visit

Benefits of the rigorous spraying regime that were seen at the other three focus groves were evident at Leafyridge Olives in Wairarapa. Whilst the foliage condition was very good, a slightly higher disease incidence was evident than other focus groves. Tightening up the protectant spray interval to 21 days back from 30 days outlined by Craig would likely improve foliage condition further. However the foliage canopy at this focus grove was generally very good and satisfactory. The site and micro-environment is challenging, quite similar to the Canterbury focus grove, where wind and drought are big factors affecting tree productivity and condition. The severe drought periods in Wairarapa through summer and autumn is likely to be contributing to some heterogeneity in leaf and tree condition that could be observed as variable leaf colour amongst trees across the grove.

Return flowering looked to be adequate for a successive annual crop in 2017. The dependence on good annual shoot growth as one precursor for good flowering is affected by the stressful conditions of this site. Return flowering was most variable here amongst the four focus groves but at this stage not considered problematic. We will be able to re-evaluate this in the March 2017 visits when fruit set and crop load will be clearly visible.

Tree structure renovation for canopy light and spray penetration is progressing and where carried out the previous year, the renewal growth was very evident and constructive to the objectives. Further work was defined and canopy renovation is the key grove improvement activity pending, now that the spray regime is established and providing the benefits of good leaf condition and retention.

Section Two Focus Grove Field Day Minutes – Prepared by Regional Chairs

Nelson Focus Grove Field Day

Held at Kakariki Olives on October 27, 2016.

Present were Stuart Tustin and Andrew Taylor (consultants), John and Helen Dunlop - Focus Grove hosts, John Ritchie and Lyn Aimers from Lakewood Products and 19 Nelson olive growers. The Focus Grove report presented here was prepared by the local Olives NZ chairperson.

The first Nelson Field Day was a huge success both in numbers attending and in the content of the practical demonstrations from Stuart and Andrew.

There was a lot of discussion around the pruning carried out to date and the effectiveness of the spraying programme. A lot of discussion was held on the potential fruit loading based on the amount of flowers developing which is looking good at this early stage. It was felt that this was definitely an indication that the spraying and pruning carried out to date was having the desired effect.

A number of different tree shapes were selected for further attention with the emphasis being on canopy shape for maximizing light and spray penetration. Having Stuart's explanations with each cut made the pruning rationale so much clearer. The message that all tree sizes can be pruned with the same rationale demonstrated was accepted by all.

All the trees looked at and pruned have now been marked so that their progress can be monitored at future site visits.

Nelson Field Day Attendees



Nelson Field Day Activities



Canterbury Focus Grove Field Day

Held at Terrace Edge Olive Grove, Waipara 28th October 2016

Andrew Taylor and Stuart Tustin were welcomed to the grove and met with a broad cross-section of local olive producers. Attendees included Jill and Bruce Chapman - Focus Grove owners, John Ritchie and Lyn Aimers from Lakewood Products and 18 growers. The report has been prepared by the Canterbury Olives NZ chairperson.

The focus of this session was on pruning for optimum production, avoidance of on-off cycles and better disease control. Terrace Edge provided quite a different challenge to the previous day in Nelson. The trees here are of an ideal height and neat compact shapes but with dense foliage restricting spray cover, penetration and light entry.

Participants were encouraged to think of pruning as part of a 5-year process and to continually think about what branch needed to be removed to encourage the desired outcome. In a dense tree with multiple branches, anything other than removing a whole branch is mere hygiene ('cosmetic'), not pruning.

Considerations in deciding what to remove include:

- which new shoots would replace the branch to be removed and needed encouragement
- which branch held the most spent wood
- where the most blossom was appearing
- which branch was overly dominant
- which had the most disease
- which was obstructing the most light
- which branch is least likely to yield fruit on shaking.

Andrew and Stuart then dramatically illustrated the effect of removing a single branch and how it completely opened-up the tree and achieved the desired goal. Often just the removal of one major branch was necessary, removing some 20-25% of the canopy. Sometimes more dense foliage and weak branches require further pruning but the group was encouraged to be cautious at this point. That it is all too easy to over-prune and diminish productivity.

An important new point for most of us was that Leccino and Minerva are more likely to produce vigorous sprouting when a substantial stump of a branch is left on pruning. Without leaving a long stump, new growth often did not occur.

During the demonstration there was ample opportunity for questioning and the group gained valuable learning about nutritional matters such as when to best apply boron, ideal pH to target (6.5).

An appropriate spray regime for this climate was also encouraged. Mancozeb is the favoured product based on price. It is applied to achieve a raincoat preventing the penetration of fungal spores into the leaf. It is best applied every three weeks, and prior to a heavy rain and immediately after rainfall of greater than 15 - 20mm.

Canterbury Field Day Attendees



Canterbury Field Day Activities



The three pictures above illustrate the before and after of pruning. The group was encouraged to think less about the prettiness of the tree after the cut and more about the goals as listed above.

The session proved to be a very valuable opportunity for learning. It comes at a critical time in the life of many groves where maturity has been reached but pruning efforts have not kept up.

Many thanks to Stuart and Andrew from the Canterbury Branch of Olives New Zealand for this very valuable experience.

Hawke's Bay Focus Grove Field Day

Held at Aquiferia Olive Grove, 4 November 2016

In attendance were Stuart Tustin and Andrew Taylor, Bob Marshall and Shona Thompson - Focus Grove hosts, Gayle Sheridan – Olives NZ Executive Officer, John Ritchie and Lyn Aimers from Lakewood Products and 18 growers. The report has been prepared by the HB Olives NZ chairperson.

Hawke's Bay Grove Attendees



Bob welcomed everyone to the grove and explained the layout and tree varieties. He outlined the spraying and pruning regime as well as the annual productivity per tree from 2013 to 2016. Shona then explained how and why she had pruned the trees in the way she had.

Although the grove had been pruned annually, many trees had become too dense and too high (5 m plus, particularly Frantoio and Leccino) with disease in the very top 0.5m of the trees. It was apparent that even with a blast sprayer and following the manzate spray regime religiously, the chemical was not reaching the tops of the trees adequately.

Shona had pruned heavily across the grove with the intention of both reducing height and density over a two year period. One row each of Frantoio, Leccino and Picual had been left for Stuart to demonstrate pruning principles. Stuart initially talked about the objectives of pruning, emphasizing the need to get sunlight and air into the trees while still retaining a good crop load. He commented on the pruning Shona had done, saying he was concerned about a reduced crop load in the coming year and that perhaps it was a bit severe. He then pruned five trees, outlining the objectives of each cut. Stuart pruned noticeably less hard than Shona, generally only making one large cut per tree. Images of the unpruned and pruned trees are below.

Unfortunately a downpour cut the practical pruning demonstration a little short.

Shona agreed to prune the remaining 3 rows in the same fashion as Stuart so that a comparison could be made over the next couple of years with respect to disease and cropping. We will make comparisons between the Shona-pruned and Stuart-pruned trees by variety in future Field Day reports.

Hawke's Bay Pruning



Above is the unpruned Frantoio row, with the red arrow indicating one of the trees Stuart pruned. A close-up of that tree is shown below on the left. On the right is a typical tree pruned by Shona.



Wairarapa Focus Grove Field Day

Held at Leafyridge Olives - Friday, 11th November 2016

In attendance were Stuart Tustin and Andrew Taylor, Gayle Sheridan (Olives NZ Inc.), Tim Allen and Mary Hamill from MPI, Bill Kirkland from Plant and Food, John Ritchie and Lyn Aimers from Lakewood Products, Craig and Ruth Leaf-Wright - Focus Grove hosts and 49 members from the lower North Island. This report has been prepared by the Wairarapa Olives NZ Chairperson.

Wairarapa Attendees



The President of ONZ, Andrew Taylor, welcomed everyone to the Field day and reiterated the main aims of the Focus Grove Project which was to improve productivity of olive groves by developing best practice techniques and improving tree health.

Craig Leaf-Wright (of Leafyridge Olives) outlined the spraying practices followed during the previous year which was to fastidiously follow the regime of a Manzate spray of every 30 days or 20mm of rain whichever occurred first. Added to the sprays was a foliar seaweed fertiliser. There was a gap in spraying during the harvest period from early May until late July. This is an area which perhaps needs addressing in the future to maintain the integrity of the regime. Stuart Tustin commented on the relatively high refruiting buds on trees, especially Frantoio, following a high crop in the previous season. This could be explained by the improved canopy of the trees as a result of disease prevention.

Andrew showed the group examples of new growth up to 30cms long with no leaves missing and healthy fruiting wood.

Pruning Demonstration



Andrew and Stuart pruned several trees to demonstrate that at times it was necessary to remove a large limb in order to promote new growth and allow light into the canopy. It also facilitated better penetration of sprays. Pruning 15 year old trees could involve removing only one or two strategic branches to achieve this.

Trees that were pruned the previous year showed remarkable new growth at the cuts as a result of the opening up to light. The resultant foliage should be left to develop and then selected branches removed after 2 years.

Another consideration when pruning was to remove low branches heading sideways that would fall outside the catching net if using a mechanical harvester. Stuart cautioned against over pruning as this would be detrimental to the next crop yield. A balance needs to be struck and the optimal solution may only be achieved over 2 or 3 years.

The trees that were worked on during the demonstration were clearly marked and will be revisited at the next Field Day in March 2017 to check progress.

From the Kapiti Branch Chair

There was a good representation from Kapiti Coast groves at this Field Day (10 - included in the total.) As we have no separate Focus Grove in our area, members participate in the Wairarapa's.

Obviously we are facing the similar conditions and issues, with groves of the same maturity, and a need for pruning and spraying regimes; all of which are paramount in looking towards consistent cropping.

These issues are relevant to all groves, but particularly so to a number in Kapiti where owners are at a stage where they need to move to mechanical harvesting and contract pruning to be able to manage their groves. The alternative is to sell their groves or let them run down, hence the objective of achieving affordable pruning is paramount.

It is also very evident that there needs to be a paradigm shift in attitude and implementation towards a robust spraying regime for leaf disease management. This demonstration and explanation far outweighed just theoretical data.

Northland Field Day

Held at Olives on the Hill, Mangawahi – Friday 18th November, 2016.

To enable dissemination of information and participation by olive growers in Auckland, Northland and Waiheke Island, field days are held at Olives on the Hill, Mangawahi. In attendance at this field day were Stuart Tustin and Andrew Taylor, Gayle Sheridan, Greg Quinn and Cameron Baker from Yamaha Motor NZ, John Ritchie and Lyn Aimers from Lakewood Products, Chris and Linda Smith - hosts and 20 members from the upper North Island. This report was prepared by Gayle Sheridan, Olives New Zealand Executive Officer.

Andrew Taylor welcomed attendees to the field day and made special thanks to Lakewood Products and Yamaha Motor NZ for attending and providing relevant product demonstrations. Andrew over viewed the SFF Project and how the field days were being used to share information and provide practical demonstrations. The overall aim was to increase the market share for NZ EVOO by improving productivity.

Attendees at Northland Field Day



Chris Smith then explained that he and Linda had brought the property four years ago when the olive trees were 12 years old and had never been pruned. In fact the olive grove looked like a wood lot and was also overgrown. He has spent the time since bringing the grove into production through a programme of pruning and spraying. Chris said that they had decided to coppice the Leccino because the trees were in such poor health and it was evident to see the recovery of these.

Stuart Tustin said that all of the Focus groves have had different issues and therefore different requirements. He noted that this grove had been unkempt with the height of the trees and the condition of the canopy impacting effective spraying. However the spraying programme had improved tree health and leaf retention where it had been effective and new growth had minimal evidence of any disease. The challenge now was to restructure the canopy to allow both spray and light penetration. Stuart pointed out that there was little evidence of a diffused shade pattern on the ground around the trees because of the dense canopy. The aim was now to restructure the trees to remove unproductive branches, those that could not be harvested and encourage new growth.

Stuart had attendees look at the branches and note those that had very little leaf and flowering as these were candidates for pruning. Also branches that would impact on the use of machinery in the grove (tractors, harvesting equipment). Stuart said that active pruning after flowering, when you could see this, would help minimize biennial bearing. After consideration of various trees and in discussion, a number were pruned accordingly. It was immediately evident how this opened up the canopy and allowed the light through the tree. This row of trees was marked to allow a revisit at the next Field Day to gauge the impact.



Andrew spoke about the spray regime and in particular that Mancozeb/Manzate had been selected because of its proven record in stone fruit (which is what olives are), vineyards, pip fruit, etc. Although not registered specifically for olive trees in New Zealand it is registered for these other crops and internationally for olive trees. Andrew said it was also a cost effective option and acted as a protectant spray. Stuart added that meant it needed to be re-applied after rain.

Andrew gave a demonstration of grafting on to the coppiced trees and this was followed by a presentation on the Yamaha helicopter drone. Attendees then enjoyed hospitality provided by Chris and Linda Smith. Olives New Zealand is very appreciative of the generosity of the Smith in allowing their olive grove to be used for the field days and their hospitality.

Grafting Demonstration



Yamaha Drone

